

Rectangles

Use rectangle ABCD and the given information to solve each problem.

1. If $AC = 4x - 60$ and $BD = 30 - x$, find BD .

$$30 - x = 4x - 60$$

$$90 = 5x$$

$$x = 18$$

$$BD = 30 - 18$$

$$BD = 12$$

2. If $AC = 4x - 60$ and $AE = x + 5$, find EC .

$$AE = \frac{1}{2} AC$$

$$x + 5 = \frac{1}{2}(4x - 60)$$

$$x + 5 = 2x - 30$$

$$x = 35$$

$$EC = AE = 40$$

3. If $m\angle BAC = 4x + 5$ and $m\angle CAD = 5x - 14$, find $m\angle CAD$.

$$m\angle BAC + m\angle CAD = 90^\circ$$

$$4x + 5 + 5x - 14 = 90$$

$$9x - 9 = 90$$

$$9x = 99$$

$$x = 11$$

$$m\angle CAD = 5(11) - 14$$

$$= 55 - 14$$

$$m\angle CAD = 41^\circ$$

4. If $AE = 2x + 3$ and $BE = 12 - x$, find BD .

$$2x + 3 = 12 - x$$

$$3x = 9$$

$$x = 3$$

$$BE = 12 - 3$$

$$BE = 9$$

$$BD = 18$$

5. If $m\angle BAC = 3x + 5$ and $m\angle ACD = 40 - 2x$.

Find $m\angle AED$.

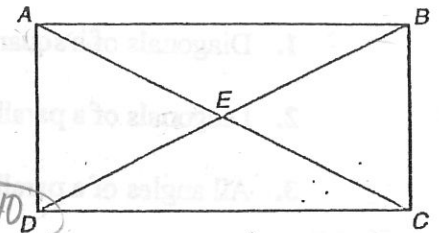
$$m\angle BAC = m\angle ACD$$

$$3x + 5 = 40 - 2x$$

$$5x = 35$$

$$x = 7$$

$$m\angle AED = 52^\circ$$



Squares and Rhombi

Use square ABCD and the given information to find each value.

1. If $m\angle AEB = 3x$, find x .

$$3x = 90$$

$$x = 30$$

2. If $m\angle BAC = 9x$, find x .

$$9x = 45$$

$$x = 5$$

3. If $AB = 2x + 4$ and $CD = 3x - 5$, find BC .

$$2x + 4 = 3x - 5$$

$$9 = x$$

$$AB = CD = BC = 22$$

4. If $m\angle DAC = y$ and $m\angle BAC = 3x$, find x .

$$y = 3x$$

$$y = 45$$

$$3x = 45$$

$$x = 15$$

5. If $AB = x^2 - 15$ and $BC = 2x$, find x .

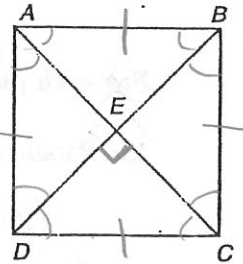
$$x^2 - 15 = 2x$$

$$x^2 - 2x - 15 = 0$$

$$(x + 3)(x - 5) = 0$$

$$x = -3, 5$$

$$x = 5$$



Use rhombus ABCD and the given information to find each measure.

6. $m\angle BCE$

$$31^\circ$$

7. $m\angle BEC = 90^\circ$

8. AC

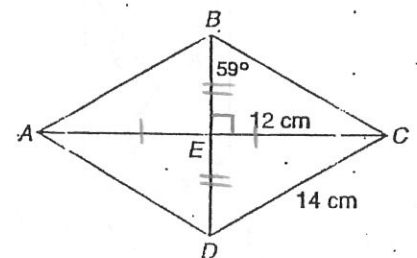
$$24 \text{ cm}$$

9. $m\angle ABD$

$$59^\circ$$

10. AD

$$14 \text{ cm}$$



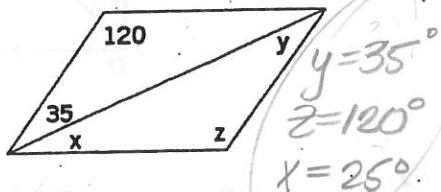
Decide whether each statement is *always*, *sometimes*, or *never* true.

When?

1. Diagonals of a square are always congruent.
2. Diagonals of a parallelogram are Sometimes perpendicular. *EX: SQUARE/RHOMBUS*
3. All angles of a parallelogram are Sometimes congruent. *EX: SQUARE/RECTANGLE*
4. Opposite angles of a rhombus are always congruent.
5. Opposite sides of a rectangle are always congruent. *EX: SQUARE*
6. A rhombus is Sometimes a square. *IF THE RHOMBUS HAS 4 RT. LS.*
7. A square is always a rhombus.
8. All angles of a rhombus are Sometimes congruent. *EX: SQUARE*
9. Diagonals of a parallelogram are Sometimes congruent. *EX: SQUARE/RECTANGLE*
10. Diagonals of a rectangle always bisect each other.
11. Diagonals of a rectangle are always congruent.
12. A square is always a rectangle.

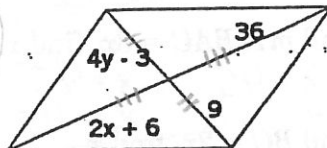
For each parallelogram below, find the values of the variables.

13. Parallelogram



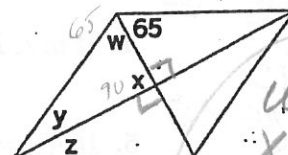
$$\begin{aligned} y &= 35^\circ \\ z &= 120^\circ \\ x &= 25^\circ \end{aligned}$$

14. Parallelogram



$$\begin{aligned} 4y-3 &= 9 & 2x+6 &= 36 \\ 4y &= 12 & 2x &= 30 \\ y &= 3 & x &= 15 \end{aligned}$$

15. Rhombus



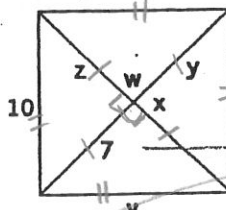
$$\begin{aligned} w &= 65 \\ x &= 90 \\ y &= 25 \\ z &= 25 \end{aligned}$$

16. Rectangle



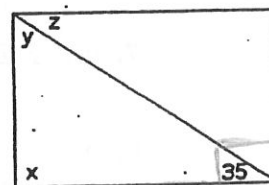
$$\begin{aligned} x &= 9 & y &= 9 \\ z &= 52^\circ \\ z &= 38^\circ \end{aligned}$$

17. Square



$$\begin{aligned} w &= 90^\circ & y &= 7 \\ x &= 90^\circ & z &= 7 \\ v &= 10 \end{aligned}$$

18. Rectangle



$$\begin{aligned} z &= 35^\circ \\ y &= 55^\circ \\ x &= 90^\circ \end{aligned}$$